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..... 31 AUG 1987.....	
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NEW ZEALAND

PATENTS ACT, 1953

No.:

Date:

COMPLETE SPECIFICATION

TILING APPARATUS AND METHOD

I/We, ALLIED RESOURCE MANAGEMENT PTY. LTD., of 250-256 Pacific

Highway, Crows Nest, New South Wales 2065, Australia, a
company incorporated in New South Wales, Australia

RPT/ARMS
17/3/86

hereby declare the invention for which I / we pray that a patent may be granted to ~~me~~/us, and the method by which it is to be performed, to be particularly described in and by the following statement:-

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This invention relates to the field of building construction or renovation and more particularly provides an improved method and apparatus for constructing facades.

As is well known existing facades such as those for the exterior walls of houses may comprise a brickwork veneer which, with new constructions may be erected immediately adjacent the interior structural members or, in the case of renovations of existing dwellings is normally disposed as a cladding over the pre-existing exterior surface which may be timber or fibreboard. In each case however the brickwork although forming little if any, part of the actual load bearing structure of the building is nevertheless self-supporting and thus requires the provision of suitable foundations and a substantial degree of expertise for its construction. The proper erection of such facades is therefore beyond the capabilities of the average handyman and requires the employment of expensive skilled labour.

While it is also known to construct external or internal facades by affixing pre-formed tiles directly onto a wall using adhesives or mechanical bracket means existing arrangements are either unreliable or require the fitting of complicated and expensive bracket assemblies over the wall surface. Further the mechanical bracket assemblies known hitherto only enable cladding tiles to be affixed in a stacked configuration rather than the more popular staggered arrangement.

It is therefore an object of this invention to ameliorate the aforementioned disadvantages and accordingly a

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tile is disclosed for use in
cladding a structure; said tile having one face
which forms the outer surface of the cladding and a second
face formed to provide one or more elongated grooves which
are arranged substantially parallel to a first edge of the
tile and are shaped to engage a channel member
mounted on said structure said first edge having a stepped
configuration to form a tongue and a second opposite edge of
the tile being undercut so that in use a plurality of said
tiles may be affixed in courses over the surface of said
structure with the first and second edges of respective tiles
of adjacent courses interfitting to provide a recessed joint
therebetween which is shaped to retain grout.

15 One preferred embodiment of this invention will now be
described with reference to the attached drawings in which:

Fig. 1 is a perspective view of one form of cladding
tile according to this invention;

20 Fig. 2 is a cross-sectional view showing a preferred
means of fixing the tile of Fig. 1 to a support surface;

Fig. 3 is a perspective view of a preferred form of
channel member according to this invention;

25 Fig. 4 shows an alternative means of fixing the tile of
Fig. 1 to a support surface using the channel member depicted
in Fig. 3;

Figs. 5 to 8 show further examples of the abovementioned
cladding tiles affixed over a support structure;

Fig. 9 shows a second embodiment of a cladding tile

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according to this invention;

Fig. 10 shows a second embodiment of a channel member according to this invention;

5 Fig. 11 shows the preferred means of fixing the tile shown in Fig. 9 to a support surface using the channel member of Fig. 10; and

Fig. 12 shows a preferred form of spacing rib for use with this invention.

Referring first to Fig. 1 the tile is designated 10 generally as 1 and comprises a planar surface 2 which forms the outer surface of the cladding and an inner face 3 adapted to engage with the channel member. More specifically face 3 is shaped to provide a pair of elongated grooves 5 extending along its length. Each of these grooves first extends 15 inwardly of the tile at 5A and then transversely at 5B so as to form a ridge 5C on one side. The surface areas 6 and 7 between and adjacent these grooves may also be shaped to a concavity to reduce the weight of the tile, and also accommodate any electrical cables or the like disposed along 20 the support surface. The upper edge of the tile as shown in Figs. 1 and 2 is of a stepped configuration to form a tongue 8 having an outer surface 8A which is inclined towards the inner face 3 and terminates in the flat upper edge face 9. This inclined surface 8A enables the tile to interfit with 25 the lower undercut edge 10 of an adjacent identical tile as shown in Fig. 2 and also provides a neat and aesthetically pleasing recessed joint 11 therebetween. This recess 11 can be filled with grout or cement if desired to produce the

appearance of conventional brickwork.

The preferred form of channel member 12 is shown in Fig. 2 as well as Fig. 3. It may be of any convenient length and is preferably formed as one piece from rolled mild steel sheet, extruded aluminium or plastic and comprises a central web 14 between curved edge portions 15 and 16. The web may have spaced apart holes 16A along its length to receive nails or screws for securing it in longitudinal strips across the face of a structure and may also be creased along a line 17 to form in profile a shallow 'V' shape. Each of the edge portions 15 and 16 are curved to terminate in parallel lips 18 and 19 which are angled outwardly and spaced apart a suitable distance such that they can simultaneously engage within the grooves 5 of adjacent tiles as best shown in Fig. 2. Although not shown additional holes may also be provided in the lips 18 and 19 along the channel length for water drainage. In addition to supporting the weight of the tiles the novel and unique 'V' shaped profile of the channel member and the outwardly angled lips have the effect of spring loading the lower portion of each tile inwardly against the support surface 19A. This enables each succeeding tile to be quickly and simply snap fitted in place over the lower one and also provides a smooth and solid outer surface for the facade.

Each succeeding row of tiles is fitted in place by first aligning it against the support surface 19A above the lower tile such that the lips 18 and 19 of the channel members extend part way into the respective upper and lower grooves 5

of the tile. Subsequent downward movement of the tile causes the lips to engage behind the ridges 5C and the undercut edge 20 of the tile to simultaneously ride up on the inclined surface 8A of the lower tile which has the effect of securely locking the tile in place by the spring force of the lips.

An alternative form of fixing an individual row of tiles in place using the same preferred forms of this invention is shown in Fig. 4. In this case the lips 18 and 19 of the channel member engage in the respective grooves of the same tile rather than extending between adjacent rows as described earlier. This form of attachment may be advantageous along the upper and lower extremities of a wall structure where only a single row of tiles or portion thereof need to be fixed in place.

Further illustrations of this embodiment of the invention are shown in Figs. 5 to 8. As shown the channel members 12 are first secured in longitudinal strips across the surface of the structure 20 and are spaced in accordance with the tile height. The tiles may be subsequently snap fitted in place in either a stacked or staggered arrangement as described earlier. As best shown in Fig. 8 the vertical edges 21 of the tiles may also be bevelled to provide a neat and crevice-free fit around the corner of the structure.

A second embodiment of a cladding tile and channel member according to this invention is shown in Fig. 9. The exterior face of this tile is similar to that shown earlier. It comprises a planar exterior surface 21 with the upper edge 22 being formed into a stepped configuration and the lower

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edge 23 undercut to interfit with an adjacent tile. The inner face 24 of this embodiment however omits the concavities 6 and 7 displayed in Fig. 1 and instead includes straight sided rectangular channels 25 and 26 which extend the length of the tile. It is envisaged that this configuration would facilitate the production of the tile from existing extrusion plant without expensive retooling costs.

5 An alternative form of channel member 26A which may be used to mount either of the cladding tiles depicted in Figs. 10 or 9 is shown in Fig. 10. It generally follows the basic shape of configuration of the member shown in Fig. 3, however the central crease 17 of the first embodiment is replaced by a shallow rounded trough 27 along the length of the member. 10 The upper and lower lips 28 and 29 have also been modified and now comprise substantially planar horizontal and angled segments 30 to 33. It has also been found advantageous to provide a set of mounting holes 34 along the length of the central web approximately two-thirds of the distance down 15 from the upper edge. Preferably these holes are spaced apart by a distance "A" of about 45mm. With standard constructions this spacing has been found to maximize the number of fixing elements along the length of the member which engage building studs. Other spacing for these holes however may be found 20 appropriate for different installations. 25

Fig. 11 shows a further alternative arrangement for fixing the cladding tiles to a supporting surface. While the channel members 26A support the rear faces of the tiles in a

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like manner to that shown previously by Fig. 2 in this case they are vertically spaced so as to only engage across alternate tile joints 35. In order to prevent any looseness in the tiles or undulations in the external surface adjacent 5 the intermediate unsupported joints 36 a spacing rib 37 may be disposed as shown between the inner face of the tiles adjacent their upper edge and the supporting surface 38. One preferred form of this rib is depicted in Fig. 12. It comprises a substantially planar top and rear surfaces 39 and 10 40 with the front surface curving outwardly towards the top to form a concavity 41. This rib thus neatly abuts the cladding tile as shown in Fig. 11, with the rear surface 40 resting against the support wall and the upper edge of the tile seating in the concavity 41. The rib may be constructed 15 of any suitable material such as plastic, rubber or metal and may be of any convenient length. The cross-sectional dimensions may also be varied to ensure a suitable spacing behind the tiles for a flat external finish on the structure.

It will thus be appreciated that this invention at least 20 in the form or the embodiment described provides a novel, unique and low cost apparatus and method for cladding surfaces. Clearly however the particular example described is only one form of this invention and a wide variety of modifications may be made which would be apparent to a man skilled in the art. For example although the cladding should 25 preferably simulate standard building brick constructions the particular shape, configuration and size of the channel member and tiles as well as the grooves therein may be

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modified according to application and/or design preference.

Also while the preferred material for the tiles is a ceramic and they are thus designed for production as a twin extrusion clearly a wide variety of other suitable weather resistant substances such as injection mouldable plastics may 5 also be used.



WHAT THIS CLAIM IS:

1. A tile for use in cladding a structure; said tile having one face which forms the outer surface of the cladding and a second face formed to provide one or more elongated grooves which are arranged substantially parallel to a first edge of the tile and are shaped to engage a channel member mounted on said structure said first edge having a stepped configuration to form a tongue and a second opposite edge of the tile being undercut so that in use a plurality of said tiles may be affixed in courses over the surface of said structure with the first and second edges of respective tiles of adjacent courses interfitting to provide a recessed joint therebetween which is shaped to retain grout.
2. The tile as claimed in claim 1 wherein in use said first edge is the upper edge of the tile and said second opposite edge is the bottom edge of the tile.
3. The tile as claimed in claim 1 or 2 wherein each of said grooves first extends inwardly of said first face and then transversely so as to form a tongue.
4. The tile as claimed in any one of the preceding claims wherein there are two spaced apart grooves in said second face and a channel is formed between said grooves to reduce the weight of the tile.
5. The tile as claimed in any one of the preceding claims

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wherein said one face is sized to simulate standard building brick dimensions.

6. A tile for cladding a structure said tile being substantially as described herein with reference to figures 1 to 8 or 9 to 12.

7. The tile as claimed in any one of claims 1 to 5 in combination with the channel member, said channel member comprising a central web adapted to receive a mechanical fixing means for mounting said member on the structure and a pair of lips formed along the edges of said member to engage the grooves in said tile, the central web being shaped so that in use said plurality of tiles are biased against the surface of the structure in an interlocking relationship.

8. A structure when clad with one or more tiles as claimed in any one of claims 1 to 6. DATED THIS 9th DAY OF July 1987

A. J. PARK & SON
PER *Johnston*
AGENTS FOR THE APPLICANTS



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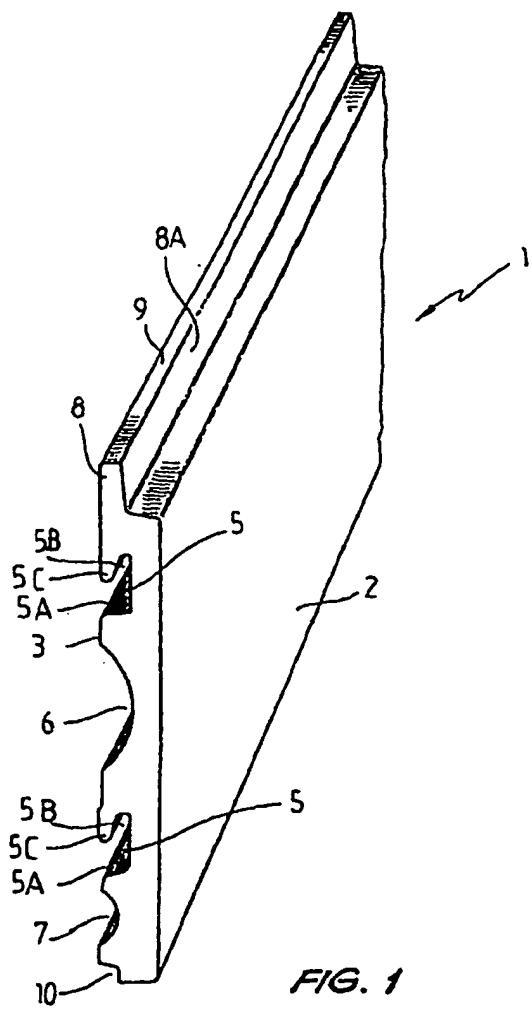


FIG. 1

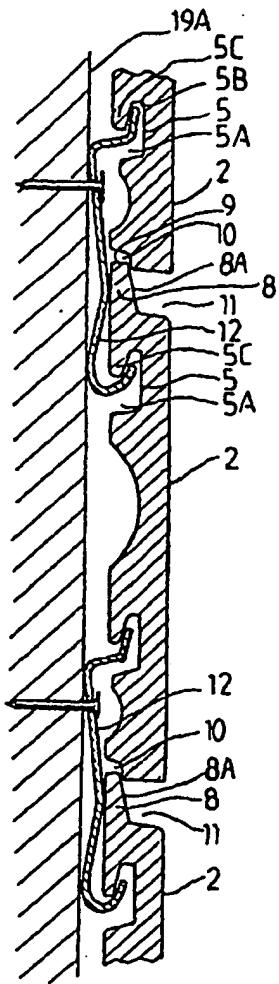


FIG. 2

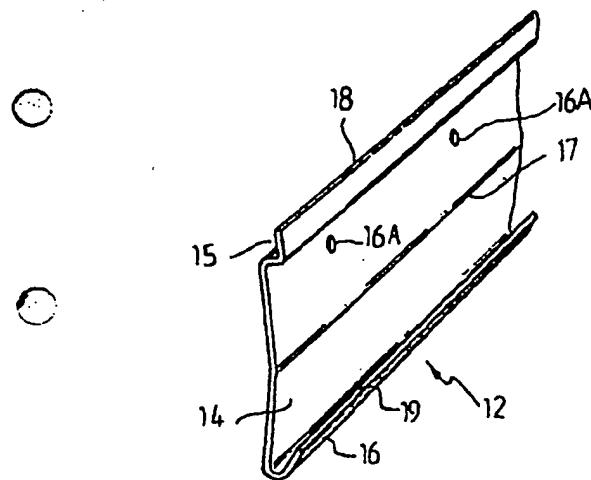


FIG. 3

Allied Resource Mana. Pty Ltd
By his/their authorised Agents,
A. J. PARK & SON,

PER Bob Hargreaves

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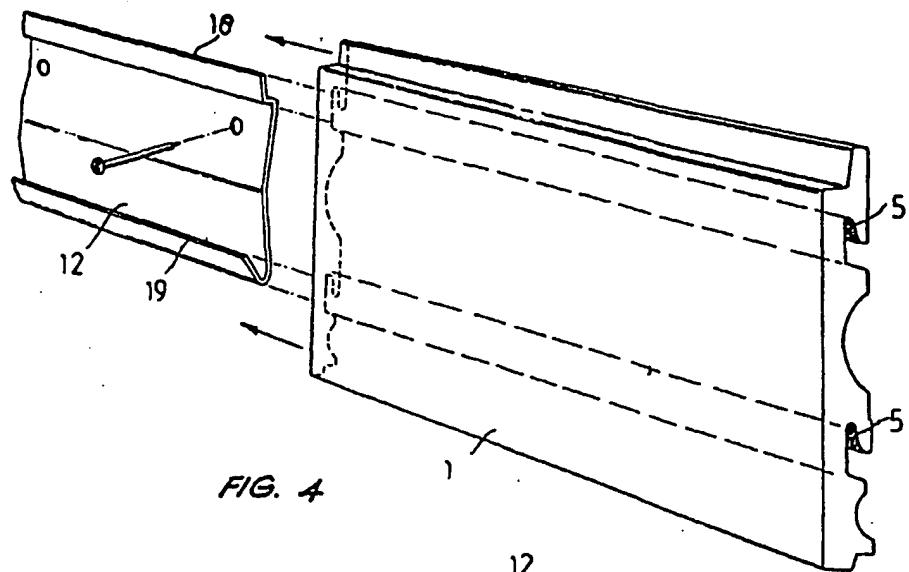


FIG. 4

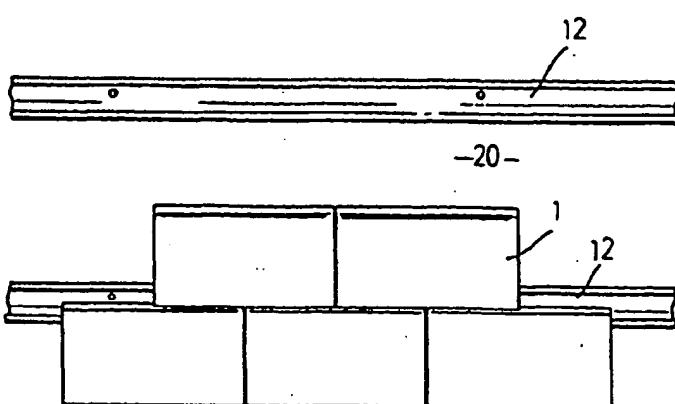


FIG. 5

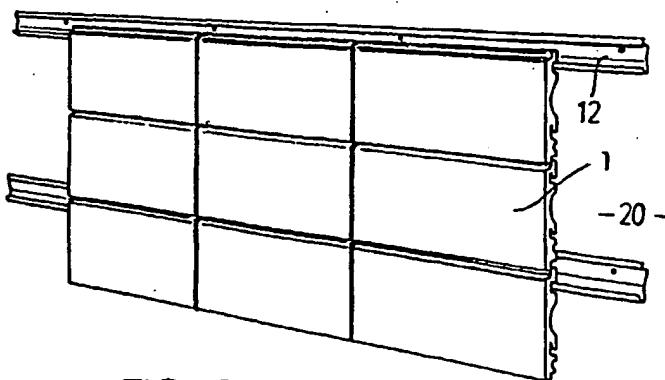


FIG. 6

Allied Resource Mana. Pty Ltd.
By his/their authorised Agents,
A. J. PARK & SON,

PER Billy E

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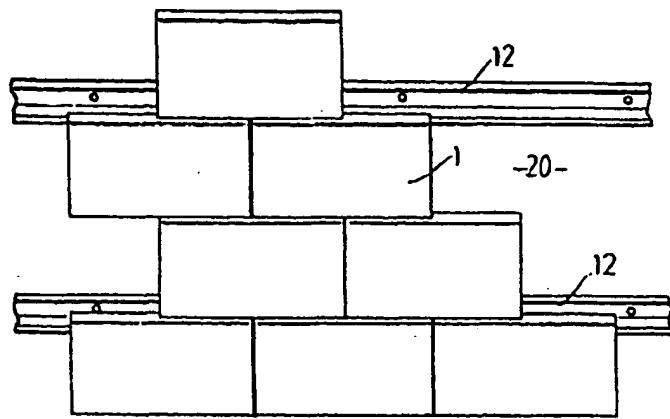


FIG. 7

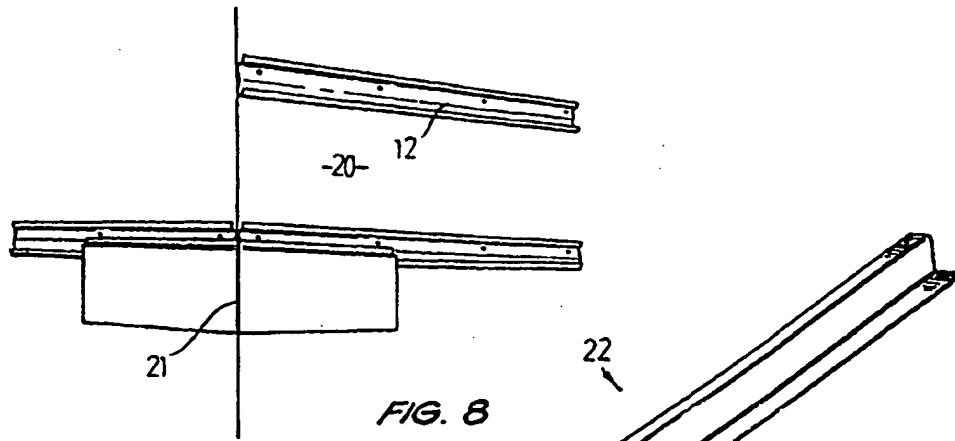


FIG. 8

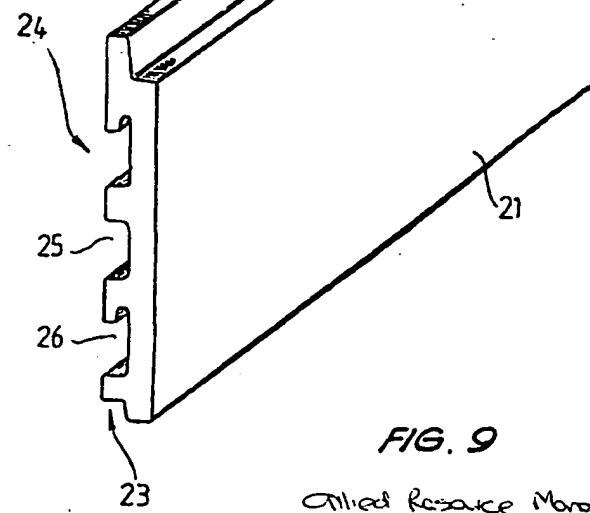


FIG. 9

Orived Resource Moray, Pty Ltd
By his/their authorised Agents
A. J. PARK & SON,

PER Brathwaite

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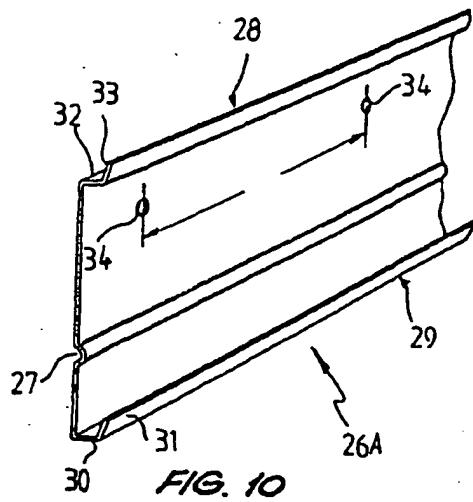


FIG. 10

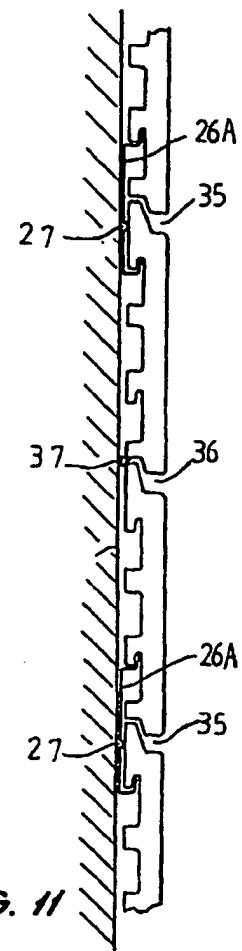


FIG. 11

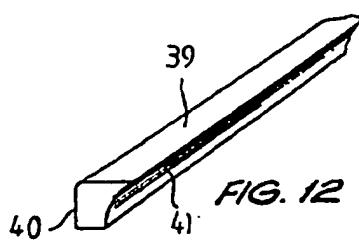


FIG. 12

Allied Resource Mgt. Pty Ltd
by his/their authorised Agents,
A. J. PARK & SON,

PER B. J. Park

END